TRANSDUCTION

USER'S MANUAL

Version 1.0
07/30/08

TR-1000VA Pure Sine Wave Inverter with AC Synchronized Transfer Switch (+/-) 48 V DC to 110 V AC 50/60 Hz

5155-23 Spectrum Way, Mississauga, ON, Canada L4W 5A1

TEL: 1-800-268-0427, 905-625-1907

FAX: 905-625-0531

Email: sales@transduction.com

Important Information

The information in this document is subject to change without notice.

All relevant issues have been considered in the preparation of this document. Should you notice an omission or any questionable item in this document, please feel free to notify Transduction.

Regardless of the foregoing statement, Transduction assumes no responsibility for any errors that may appear in this document nor for results obtained by the user as a result of using this product.

Return policy

Products returned for repair must be accompanied by a Return Material Authorization (RMA) number, obtained from Transduction prior to return. Freight on all returned items must be prepaid by the customer. The customer is responsible for any loss or damage caused by the carrier in transit.

To obtain an RMA number, call us at 905-625-1907. We will need the following information:

- *Return company address and contract*
- *Model name, model number and serial number*
- *Description of the failure*

Mark the RMA number clearly on the outside of each box, include a failure report and return the product to:

Transduction
5155 – 23 Spectrum Way
Mississauga ON Canada L4W 5A1
Attn: RMA Department

Index

Safety Precautions

WARNING!
Before installing and using your inverter, please read the safety precautions.

General Safety Precautions

Do not expose the inverter to rain, snow, spray, bilge or dust. To reduce risk of hazard, do not cover or obstruct the ventilation openings.

To avoid risk of fire and electrical shock, make sure that existing wiring is in good electrical condition and that wire size is not underrated. Do not operate the inverter using damaged or substandard wiring.

Explosive Gas Precautions

This equipment contains components which can produce arcs or sparks. To prevent fire or explosion, do not install inverter in any compartments containing batteries or flammable materials, or in locations which require ignition protected equipment. This includes any space containing gasoline powered machinery, fuel tanks, and any fittings or other connections between components of the fuel system.

Precautions when working with batteries

If battery acid contacts skin or clothing, immediately wash with soap and water.

If acid enters the eye, immediately flush eye with cold, running water and keep flushing it for at least 20 minutes. Seek medical attention immediately.

NEVER smoke, allow sparks or open flames near the battery or engine.

Do not drop metal tools on the battery. The resulting spark or short circuit may cause an explosion.

Remove personal jewelry items when working with lead acid batteries. The short circuit current produced is high enough to cause severe burns.

GENERAL FEATURES

Microprocessor based design with absolutely accurate and stable frequency
Switch selectable 50Hz or 60Hz output on all models
Very low harmonic distortion THD<3%
Standard input 48V DC
Isolated input / output for for +48V or -48V DC battery systems
Standard output 110V, 50~60Hz
Remote Control Unit (optional accessory)
Power Saver
Panel indicators for battery voltage and load level
Compact and light weight, yet rugged and vehicle rated, 83 ~ 90% efficient
Built-in, fast acting AC synchronized transfer switch (<10mSec)

INTRODUCTION

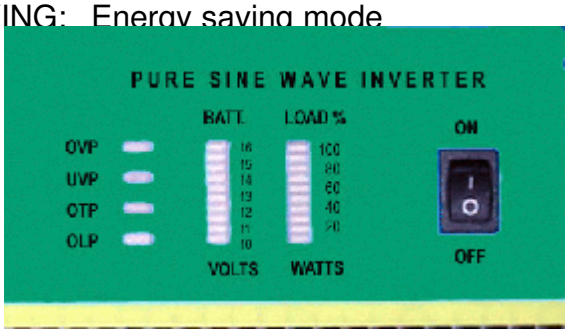
The TR-1000VA power inverters are some of the most advanced mobile AC power systems available. To get the most out of the power inverter, it must be installed and used properly.

Please read the instructions in this manual before installing and using.

FRONT PANEL

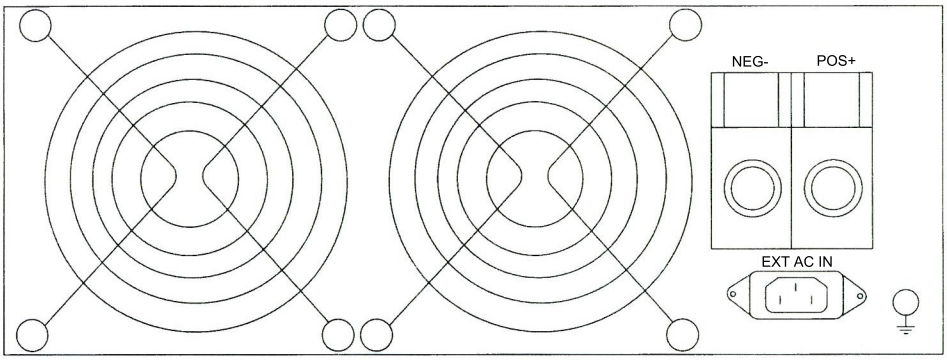
ON/OFF Switch: Leave in the OFF position during installation

POWER SAVING: Energy saving mode

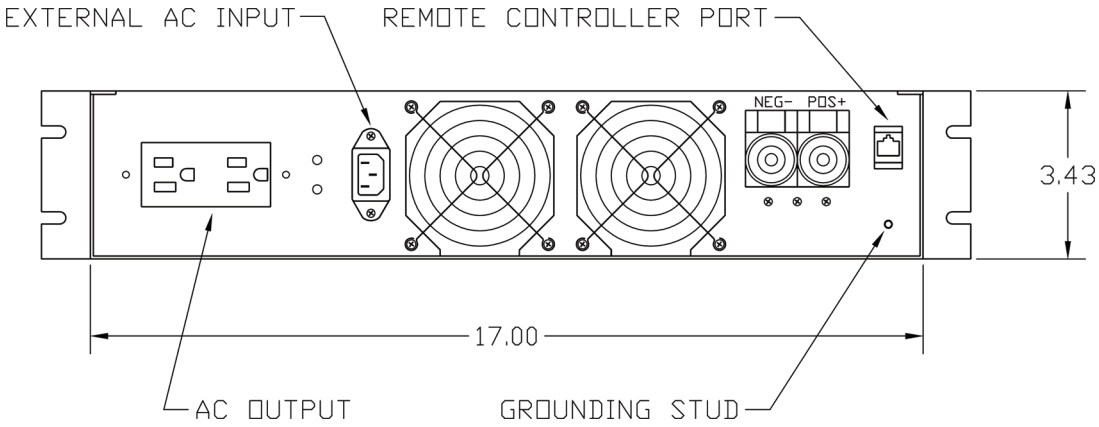


OVP: Over voltage protection
UVP: Under voltage protection
OTP: Over temperature protection
OLP: Over load protection
BATT VOLTS: Displays input voltage
LOAD% WATTS: Displays AC load wattage

REAR VIEW PANEL MOUNT VERSION



REAR VIEW RACK MOUNT VERSION



Cooling Fans:	Do not obstruct. Allow at least 1 inch clearance for air flow
Battery Terminals:	Check that the inverter voltage is compatible with your supply i.e. a 48V inverter on a 48V system. Using the spanner and cables provided, connect to 48V battery or other 48V power source. NOTE: Reverse polarity connection will blow internal fuses and may permanently damage the inverter.
Ground:	Chassis ground or to vehicle chassis using 8AWG wire. NOTE: Operation without a proper ground connection may result in electrical hazard.

SHOCK HAZARD WARNING!!

Before proceeding any further, ensure that the inverter is NOT connected to any batteries and that all wiring is disconnected from any electrical sources. Do not connect the output terminals of the inverter to an incoming AC source.

QUICK HOOKUP AND TESTING

To check performance before proceeding with the installation, do the following:

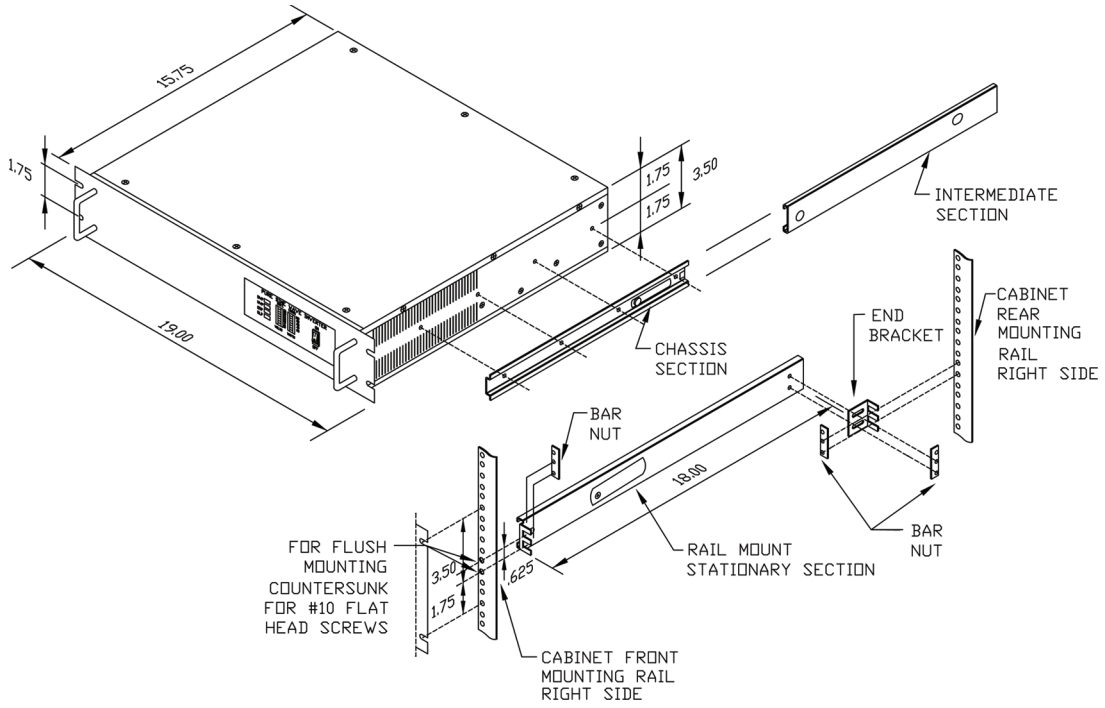
1. Unpack and inspect the inverter. Make sure the power switch is in the OFF position
2. First connect the DC negative cable to the negative terminal on the battery and then connect the cable to the NEG- terminal on the inverter. The connection on the inverter must be last. There may be a spark when this final connection is made.
3. Make sure that all DC connections are tight. Loose connections will overheat and could result in a potential hazard.
4. Before proceeding further, double check that the cable you have just connected to the NEG- terminal of the inverter is connected to the negative output terminal of the power source.
   NOTE: Reverse polarity connection will blow a fuse on the inverter and may cause permanent damage. Damage caused by reverse polarity connection is not covered under warranty.
5. Connect the cable from the POS+ terminal of the inverter to the positive terminal of the power source. Make sure the connection is secure. There may be a spark since current may flow to charge capacitors in the inverter.
6. Turn ON the inverter and check the indicators on the front panel. The BATT VOLTS should show a reading. If it does not, check your power source and the connections. The other indicators should be off.
7. Turn OFF the inverter. The indicator lights may blink and the internal alarm may sound briefly. This is normal. Plug the test load in to the AC receptacle on the front panel of the inverter. Leave the test load switch off.
8. Turn ON the inverter and turn ON the test load. The inverter should supply power to the load. To measure the true output r.m.s. voltage of the inverter, a meter must be used.

INSTALLATION

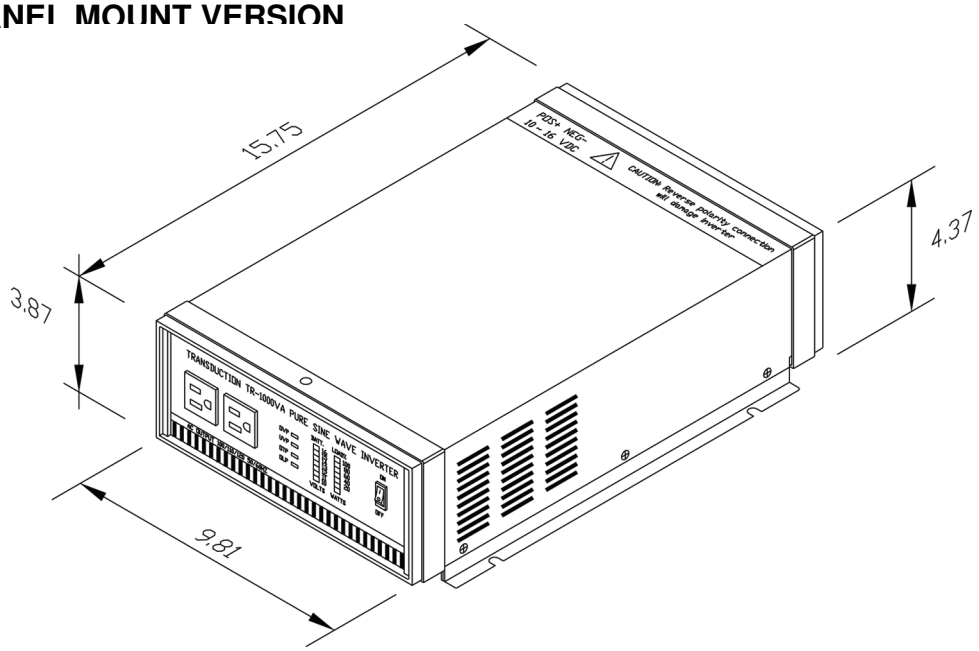
The TR-1000VA should be installed in a location that meets the following requirements:

DRY	Do not allow water to drip or splash on the inverter
COOL	Ambient air temperature should be between 0°C and 50°C. The cooler the better.
SAFE	Do not install in a battery compartment or other areas where flammable fumes may exist.
VENTILATED	Allow at least 1 inch of clearance around the inverter for air flow. Ensure that ventilation openings are not obstructed.
DUST-FREE	Do not install in a dusty environment.

TR1000VA RACK MOUNT VERSION showing installation of chassis slides



TR1000VA PANEL MOUNT VERSION



AC Safety Grounding:
During the AC wiring installation, AC input and output ground wires are connected to the Inverter. The AC input ground wire must connect to the incoming ground from your AC utility source. The AC output ground wire should go to the grounding point for your loads.

Neutral Grounding:
The neutral conductor of the AC output circuit of the Inverter is automatically connected to the safety ground during Inverter operation. This conforms to National Electric Code requirements. For models configured with a transfer relay, when AC power is present and the Inverter is in bypass mode, this connection is not present and so conforms to code requirements.

Ground Fault Circuit Interrupters (GFCI's):
Installations in recreational vehicles will require GFCI protection of all circuits connected to the AC output of the Inverter.

Connecting Battery Cables to the DC Input Terminals:
Cables should be less than 10 feet long (3 meters) and the correct gauge to handle the required current, in accordance with the codes/regulations applicable to your installation. Incorrect cabling will decrease Inverter performance and may cause poor surge handling, voltage warnings and shutdowns.

OPERATION

ON/OFF
Simply turn ON the Inverter and it is ready to deliver AC power. If operating more than one load from the Inverter, turn them on separately after the Inverter has been turned on. NOTE: Turning OFF the Inverter does not disconnect the power source from the Inverter.

The Inverter operates from the following AC input voltage ranges:
42 to 62 V DC (positive or negative ground)

Battery Voltage Indicator:
The battery voltage bar graph indicates voltage at the input terminals of the Inverter, at low current input and is very close to the battery voltage. At high input current, this voltage will be lower than the battery voltage because of the voltage drop across the cable and connections. Ideally, the voltage should remain in the green areas of the bar graph. If it goes in to the red at top or bottom of the bar graph, the Inverter may shut down.

Load Watt Indicator:
The AC load watt bar graph shows the power drawn from the Inverter. It will indicate watts by load. For long term operation, this should be in the green and orange. Short term operation in the red is possible. If this indicator flashes the entire bar graph the Inverter will shutdown to protect itself.

OVP Over Voltage Indicator:
Indicates inverter shutdown due to input voltage over the 48V DC limit.

UVP Under Voltage Indicator
Indicates shutdown due to input voltage less than 48V DC.

OTP Over Temp Indicator
Indicates shutdown due to overheating. This may occur if the inverter is operated at power levels above its rating or if installed so that heat cannot dissipate properly. It will restart automatically once it has cooled down.

OLP Overload Indicator
Indicates shutdown because output circuitry has been shorted or drastically overloaded. Switch to OFF, correct the fault condition and switch back to ON.

DIP SWITCH FUNCTIONS AND AC TRANSFER SWITCH (refer to table below)

DC/AC Out Mode
AC output power is supplied by DC/AC. AC Transfer Switch is on. No power saving function.

DC/AC + Power Saving Mode
AC output power is supplied by DC/AC. AC Transfer Switch is on. When AC output load is turned off, DC/AC will go into power saving mode and reduce battery consumption.

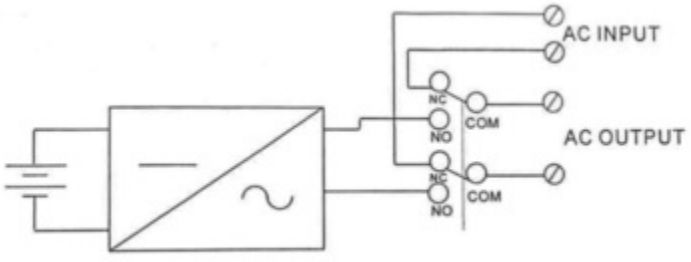
UPS Mode
When power is supplied by AC input, the AC Transfer Switch is off and DC/AC is in stand-by mode. If this supply of power is cut off, the AC Transfer Switch will switch to on (10mSec delay) and AC output will be supplied by DC/AC. When AC input is back to normal, the AC Transfer Switch will change back to off.
NOTE: A change of +15% in the AC input power will also initiate UPS Mode.

UPS Mode + Delay Mode + Power Saving
Same as UPS Mode but with 5mSec delay. With AC input power, the AC output is by DC/AC, but when the AC output load is turned off, then the DC/AC will switch to power saving mode.

DIP Switch (110V)

S1	S2	Function	S3	S4	Output voltage	S5	Output Frequency
OFF	OFF	DC/AC OUT MODE	OFF	OFF	120V	OFF	60Hz
OFF	ON	DC/AC + POWER SAVING MODE	ON	OFF	115V	ON	50Hz
ON	OFF	UPS MODE	OFF	ON	110V		
ON	ON	UPS MODE + DELAY MODE + POWER SAVING	ON	ON	100V		

AC Transfer Switch



SPECIFICATIONS

Model	TR1000VA-48
Continuous output power	1000W
Output power surge	1400W
AC Output Voltage	100/110/120V ±2%, 220/230/240V ±2%, DIP switch selectable
Output voltage regulation	-8% ± 3%
Output frequency	50/60Hz selectable, ±0.05% accuracy
Output wave form	Pure Sine Wave <3% THD
Efficiency (full load)	83 - 85%
No Load power consumption	<1.5W (in power saving mode)
Input voltage range	44 ~ 56VDC
Power saving recovery time	1 second
AC transfer time (UPS mode)	<10mSec max
LED status indicators	High/Low battery shutdown, over temperature shutdown, overload shutdown, input DC voltage scale meter, output watts % scale meter
Protection features *Remote controller is optional	Overload, short circuit, over/under input voltage, over temperature, reverse input polarity (by fuse)
RS485 Remote Controller (optional)	Power output ON/OFF, power saving mode, reset, error messages and more
Operation temperature range	0~40°C (32~104°F)
Dimensions (LxWxH)	Rack mount 15.75" x 19" x 3.5" Panel mount 15.75" x 9.81" x 3.87"
Weight	Rack mount 22.5 Lb (10.25 Kg) Panel mount 12.13 Lb (5.5 Kg)
Warranty	Two year warranty, F.O.B. Transduction

FOR SERVICE AND SUPPORT CONTACT:

Transduction
5155 Spectrum Way, Bldg 23
Mississauga, ON L4W 5A1 Canada
Tel: 905-625-1907 Fax: 905-625-0531
email: sales@transduction.com